Program Profile		
Program	Program name	Green Hydrogen Production Integrated with Solar PV for Sustainable Energy Systems.
	Category	B5 – Industrial Application

Summary of Program	
Program Name	Green Hydrogen Production Integrated with Solar PV for Sustainable Energy Systems.
Category	B5 – Industrial Application
Abstract of Program	This program pioneers the integration of solar photovoltaic (PV) power with water electrolysis to produce green hydrogen, a carbon-free fuel that can drive the next generation of sustainable energy systems. Unlike conventional PV setups that supply electricity only during sunlight hours, this initiative stores surplus renewable energy in the form of hydrogen—an energy carrier with versatile applications in transportation, power generation, and industry. By deploying advanced PV modules, high-efficiency electrolyzers, and safe hydrogen storage, the system ensures reliable, round-the-clock operation. Beyond technology, the program supports Bangladesh's national climate commitments, contributes to global decarbonization efforts, and provides students and researchers with hands-on expertise in one of the most transformative clean-energy solutions of the future.

Details of Program		
Planning		
Objectives	Long-term Goals	• Establish WUB as a leader in green hydrogen research. • Support clean fuel adoption in transportation and industry. • Build industry-academic partnerships in hydrogen energy.
	Short-term Targets	• Build and test a pilot solar PV-hydrogen system within one year. • Publish results in indexed journals and conferences. • Apply for intellectual property rights for system design.
	Rationale	Bangladesh, like many developing countries, faces growing energy demands and carbon emissions. Green hydrogen offers a carbon-free fuel that can be produced locally using renewable solar PV. This integration addresses intermittency of solar power, enhances energy security, and supports climate goals.
Subject (Leader)	Initiator(s)	RASUL, Md. Abdu Rabbir
	Champion(s)	RASUL, Md. Abdu Rabbir
	Major team member(s)	Research Team of Department of EEE, World University of Bangladesh
Environment	Nature/Society	Addresses the need for sustainable, clean energy to reduce greenhouse gases.
	Industry/Market	Potential use in power generation, transport, and fertilizer industries requiring clean fuels.

	Citizen/Government	Supports government targets on renewable energy and climate commitments.
Resources	Human resources	Skilled faculty, graduate researchers, and industry specialists collaborate.
	Financial resources	The university will provide seed funds, with the potential for grants and industrial sponsorship.
	Technological resources	Solar PV panels, electrolyzers, hydrogen storage tanks, lab facilities.
Mechanism	Strategy (Weight/Sequence)	• Prototype development. • Testing and optimization. • Industry collaboration for deployment.
	Organization	With assistance from the university's innovation center, the program is carried out by the Department of Electrical and Electronic Engineering.
	Culture	University encourages research-led innovation, patent filing, and industry partnerships.
Doing		
Launch date		January, 2025
Responsible organization		Department of EEE, World University of Bangladesh
Program content and process		The program begins with feasibility analysis and simulation of PV-electrolyzer integration. A small-scale pilot plant will be built with solar panels, electrolyzers, and hydrogen storage. Performance data will be analyzed and published. Industry partners will be engaged for scaling.
Key highlights of the content/process		• First-of-its-kind solar PV-hydrogen pilot at WUB. • Direct contribution to clean fuel research. • Hands-on training for student.
Differences from traditional approaches		Unlike conventional solar PV, which only produces electricity, this project stores excess energy in hydrogen, making the system dispatchable and sustainable.
Progress as of today		Initial research completed; pilot design stage ongoing.
Problems in implementation		High cost of electrolyzers and hydrogen storage.
Approaches to solve the problems		Seek funding from government and industries, and adopt cost-effective designs.
Completion date, if completed		Ongoing.
Seeing		
Impacts on students		Hands-on training in hydrogen energy systems and renewable integration.
Impacts on professors		Increases academic output in renewable energy field.

Impacts on university administration	Positions WUB as a pioneer in hydrogen energy research in Bangladesh.
Responses from industry/market	Positive first responses from players in the renewable energy industry.
Responses from citizen/government	Aligned with government's vision for renewable energy and climate action.
Measurable output (revenues)	Potential licensing of hydrogen integration technology.
Measurable input (expenses)	Estimated pilot cost $50,000–$80,000.
Cost-benefit analysis for effectiveness	Because of the technology's scalability, anticipated long-term benefits exceed initial expenditures.
Future Planning	
Where does the project go from here?	Future phases will expand the pilot into a larger demonstration plant, with integration into microgrids and industrial users. Research will extend into ammonia and fuel cell integration.
Addendum	
Exhibits, pictures, diagrams, etc.	System design schematics, pilot plant photos (to be attached).
Reports, mimeos, monographs, books, etc.	Research papers and technical reports.
Others which may help explain the program (including website links)	